

1 1. A gearbox comprising,  
2 a plurality of shafts each shaft having a gear for forming a gearset between adjacent  
3 shafts in the gearbox, wherein all the gears are sized having ratios varying by degrees in of a  
4 common ratio in a geometric sequence.

1 2. A gearbox as in claim 1 wherein,  
2 the separation in the degree of difference of the common ratio in the geometric sequence  
3 for all gearset ratios between an adjacent pair of shafts is the same.

1 3. A gearbox as in claim 2 wherein,  
2 the degree of separation of the common ratio of the gearsets between the pairs of shafts is  
3 calculated by first dividing the number of gearset combinations of forward speeds in the gearbox  
4 by the number of gearsets between two shafts, where the number of gearsets is two or more, to  
5 determine the common ratio of the gearsets between that pair of shafts,

6 then determining degree of separation of the common ratio of the gearsets between the  
7 next pair of shafts by the number of degrees of common ratio from the prior pair of shafts  
8 divided by number of gearsets between next pair of shafts until all shaft pairs are calculated and  
9 wherein the degree of separation of the common ratio of the gearsets in the last pair of shafts  
10 calculated may have only 1 gearset between them.

1 4. A gearbox as in claim 2 wherein,  
2 the gearset ratio values for the gearsets between each shaft are chosen such that a  
3 combination of the gearsets selected in the gearbox yields an input to output ratio of 1 to 1 for  
4 the gearbox.

1 5. A gearbox as in claim 4 wherein,  
2 a join gear on a shaft engages a first pinion on a first shaft and a second pinion on a  
3 second shaft such that the join gear is part of two gearsets.

1 6. A gearbox as in claim 5 wherein,  
2 a pair of adjacent join gears on a shaft employs an addendum modification shaft to  
3 account for the difference in spacing between the shafts due to different gear sizes in the gearsets  
4 such that the gear teeth all mesh properly.

1 7. A gearbox as in claim 2 wherein,  
2 a reverse pinion engages a shaft for providing one or more reverse speeds.

- 1 8. A gearbox as in claim 2 wherein,  
2 a differential is affixed to at least one shaft.
- 1 9. A gearbox as in claim 2 wherein,  
2 the gearbox has a frame member.
- 1 10. A gearbox as in claim 2 wherein,  
2 the gearbox has more than one frame member.
- 1 11. A gearbox as in claim 2 wherein,  
2 at least one shaft has two outward ends extending from the gearbox for connecting to  
3 other objects.
- 1 12. A gearbox as in claim 11 wherein,  
2 the gears in the gearbox have teeth on opposite sides and the shaft can be turned around  
3 in the gearbox to engage the teeth on the opposite side of the gear.
- 1 13. A gearbox as in claim 2 wherein,  
2 the gearbox has at least one shaft that is a split with a clutch to connect the split shafts.
- 1 14. A gearbox as in claim 2 having,  
2 5 shafts with 4 sets of gearsets between 4 pair of shafts, wherein the first set of gearsets  
3 has 2 gearsets, the second set of gearsets has 2 gearsets, the third set of gearsets has 2 gearsets,  
4 and the fourth set of gearsets has 3 gearsets, to produce a gearbox having 24 forward speeds  
5 when one gearset is selected from between each pair of shafts.
- 1 15. A gearbox as in claim 2 having,  
2 4 shafts with 3 sets of gearsets between 3 pair of shafts, wherein the first set of gearsets  
3 has 2 gearsets, the second set of gearsets has 3 gearsets, the third set of gearsets has 4 gearsets, to  
4 produce a gearbox having 24 forward speeds when one gearset is selected from between each  
5 pair of shafts.
- 1 16. A gearbox as in claim 2 having,  
2 4 shafts with 3 sets of gearsets between 3 pair of shafts, wherein the first set of gearsets  
3 has 2 gearset, the second set of gearsets has 2 gearsets, and the third set of gearsets has 6  
4 gearsets, to produce a gearbox having 24 forward speeds when one gearset is selected from  
5 between each pair of shafts.

1 17. A gearbox as in claim 2 having,

2 5 shafts with 4 sets of gearsets between 4 pair of shafts, wherein the first set of gearsets  
3 has 1 gearset, the second set of gearsets has 1 gearset, the third set of gearsets has 3 gearsets, and  
4 the fourth set of gearsets has 8 gearsets, to produce a gearbox having 24 forward speeds when  
5 one gearset is selected from between each pair of shafts.

1 18. A gearbox as in claim 2 having,

2 3 shafts with 2 sets of gearsets between 2 pair of shafts, wherein the first set of gearsets  
3 has 4 gearset, and the second set of gearsets has 6 gearset, to produce a gearbox having 24  
4 forward speeds when one gearset is selected from between each pair of shafts.

1 19. A gearbox as in claim 2 having,

2 5 shafts with 4 sets of gearsets between 4 pair of shafts, wherein the first set of gearsets  
3 has 1 gearset, the second set of gearsets has 2 gearset, the third set of gearsets has 3 gearsets, and  
4 the fourth set of gearsets has 4 gearsets, with one shaft being a split shaft with at least one gearset  
5 on each side of the split shaft to produce a gearbox having 36 forward speeds when one gearset is  
6 selected from between each pair of shafts.

1 20. A method for selecting gear sizes for gearsets in a gearbox comprising:

2 selecting a value for a term to be used in a geometric ratio of the gear sizes,

3 selecting the number of gears produced by the gearbox,

4 selecting the number of shafts in the gearbox,

5 selecting the number of gearsets between each pair of shafts in the gearbox,

6 determining the degree of difference of the term in the geometric sequence of the gearsets  
7 in each pair of shafts by dividing the number of gearsets into the number of gears in the gearbox  
8 for the first pair of shafts and then dividing the remainder by the number of gearsets between the  
9 next pair of shafts and repeating the process for each pair of shafts starting with the highest  
10 remaining number of gearsets between each shaft,

11 selecting the value of each gearset with maintaining the degree of difference for each pair  
12 of shafts.

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- 1 21. A method for selecting gear sizes for gearsets in a gearbox as in claim 20 with the  
2 additional step of,  
3 selecting the values of each gearset such that the gearbox produces an input to output  
4 ratio of 1 to 1.  
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